

MCF 3M

Name:_____

Investigation: Let it Roll!

Question: How will the diameter of the can affect the sinusoidal function produced?


Procedure:

1. Place a small piece of masking tape on the bottom edge of an empty can.

2. Measure the diameter and find the circumference of the can. Record the diameter of your can._____cm

3. With a marker, mark off 8 to 10 marks around the edge of the can, evenly spaced.

4. Stick a measuring tape to the floor and place the can on its side to line up the masking tape with 0 cm mark on the tape.



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5. Roll the can along the measuring tape until the first mark touches the tape. Mark down the distance the can has rolled (where the mark touches the measuring tape). Measure the height of the masking tape above the floor.

6. Roll until the next mark has touched the measuring tape.

7. Repeat.

8. Record data for two revolutions of the can.

Distance from start (cm)	Height of tape (cm)	Distance from start (cm)	Height of tape (cm)

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7. Graph the data on a piece of graph paper.

8. What is the amplitude and period of the sinusoidal function? Show your work!

9. Find the equation of the function that models the sinusoidal function for the data you have graphed. Show your work!

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10. Predict how changing to a larger or smaller can will affect your graph and the function.

11. Repeat the activity with a can of smaller or larger diameter

Record the diameter of your can._____cm

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Record the diameter of your can._____cm

Distance from start (cm)	Height of tape (cm)	Distance from start (cm)	Height of tape (cm)

12. Graph the data on a piece of graph paper.

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13. Find the equation of the function that models the sinusoidal function for the data you have graphed. Show your work!

14. Were you correct in your prediction?

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15. Predict what the sinusoidal function would be for a can
a) half the diameter of your first can
b) three times the diameter of your first can

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TIPS	Level 1	Level 2	Level 3	Level 4
Determine the equation of a function that best models a data set	Uses a problem solving strategy with limited skill	Uses a problem solving strategy with moderate skill	Uses a problem solving strategy with considerable skill	Uses a problem solving strategy with great skill to create accurate models.
Makes predictions of how change will affect sinusoidal function	Justifies with a limited connection to original model OR errors in how change will affect function	Justifies with some connection to original model OR Minor error in how change affects function	Predicts change accurately with justification that refers to original model	Predicts change accurately with detailed justification that refers to original model
Communication				
Correct use of mathematical conventions in drawing graph	Minor errors in all graphs	Minor errors in graph	All graphs are plotted properly with appropriate scales	All graphs are plotted properly with appropriate axes labelled
Correct use of mathematical symbols, labels, units and conventions	Sometimes uses mathematical symbols, labels and conventions correctly	Usually uses mathematical symbols, labels and conventions correctly	Consistently uses mathematical symbols, labels and conventions correctly	Consistently and meticulously uses mathematical symbols, labels and conventions

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